

REMARKS

In the Notice of Omitted items the Office indicated Figures 5A-E and Figure 9 were not included in the original application papers. After careful review of the application, Applicant has determined that all of the figures were included at the time of filing, but that the specification had minor typographical errors in the numbering of the figures which are corrected by this amendment. Applicant has corrected the minor typographical errors and renumbered the figure references in the specification. No new matter has been added.

CONCLUSION

In light of the preliminary amendments contained herein, Applicant submits that the application is in condition for allowance, for which early action is requested.

Applicant does not believe that any fees are due with this response. If, however, it is determined that fees are owed, please charge any such fees or over payments to Deposit Account No. 17-0026.

Respectfully submitted,

Dated: September 24, 2001

By:

Kent Baker 38,822 for
Abdollah Katbab
Attorney for Applicant
Registration No. 45,325

QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, California 92121-1714
Telephone: (858) 651-4132
Facsimile: (858) 658-2502

Appendix A

1. Amendment to 3rd paragraph, page 3 of the Specification:

~~Fig. 2 shows a block diagram representation of a system for generating waveforms suitable for transmission in a communications system in accordance with the present invention;~~

2. Amendment to 4th paragraph, page 3 of the Specification:

Fig. 23 shows a graphical representation of a comparison of the peak to average ratio of a plurality of different Walsh code sets;

3. Amendment to 5th paragraph, page 3 of the Specification:

Fig. 34 shows a graphical representation of a comparison of the peak to average ratio at equal channel gains and the peak to average ratio at highly unequal channel gains for a plurality of Walsh code sets;

4. Amendment to 6th paragraph, page 3 of the Specification:

Figs. 45A-E show flow chart representation of the biased bin balancing algorithm of the present invention;

5. Amendment to 7th paragraph, page 3 of the Specification:

Fig. 56 shows a state diagram representing the states of the method of the present invention; and

6. Amendment to 8th paragraph, page 3 of the Specification:

Figs. ~~6-87-9~~ show graphical representations of comparisons of the effects of differing assignments of Walsh code vectors.

7. Amendment to 2nd paragraph, page 8 of the Specification:

~~Fig. 2 shows a block diagram representation of waveform generation system 200. Within waveform generation system 200 summing circuit 206 receives and combines a plurality of input signals 202A-N. Each input signal 202i is formed of a traffic channel gain $\{G_i\}$, a message symbol $\{d_i\}$, and a Walsh code bit W_i . The traffic channel gain $\{G_i\}$ can be zero for inactive channels. For convenience all digital signals and waveforms are represented for a single symbol period i.~~

8. Amendment to 5th paragraph, page 8 of the Specification:

Fig. ~~23~~ shows graphical representation 300 that compares the peak to average ratio at equal channel gains and the peak to average ratio at highly unequal channel gains. Graphical representation 300 is a 1-CDF wherein $N=8$, RS 2 fixed full rate, where CDF is a cumulative distribution function. In order to make this comparison a simulation is performed with a plurality of Walsh code sets using only the Walsh codes set forth hereinbelow. No overhead channels are considered. Furthermore, all traffic channels are assumed to have the same traffic channel gain.

9. Amendment to 1st paragraph, page 9 of the Specification:

The following three sets of Walsh codes are used in the simulation of graphical representation 300. Each of the three sets contains eight Walsh codes. (1) $WCC-1 = \{1, 9, 17, 25, 33, 41, 49, 57\}$. Thus, in accordance with WCC-1, the product of every pair of Walsh codes used in the simulation has an index that is a multiple of eight. (2) $WCC-2 = \{0, 1, 2, 4, 8, 9, 10, 12\}$. Thus, a moderate number of pairs of Walsh codes

used in the simulation have a binary sum with an index that is a multiple of eight. (3) WCC-3 = {0, 1, 2, 3, 4, 5, 6, 7}. Thus, no pair of Walsh codes set forth in graphical representation 300 has a binary sum with an index that is a multiple of eight. Thus, Fig. 23 illustrates that the peak to average obtained using WCC-1 is much higher than the peak to average obtained using WCC-2. WCC-2, in turn, provides a peak to average that is higher than the peak to average obtained using WCC-3. These results are consistent with the results set forth above.

10. Amendment to 2nd paragraph, page 9 of the Specification:

Thus ~~three~~^{four} rules are provided for approximately determining the peak to average ratio properties of a set of Walsh codes of fixed size as follows. Rule I is directed to sets of codes having a higher number of pairs of binary Walsh code vectors whose modulo 2 sum is a Walsh code with an index that is a multiple of eight. Such sets of code vectors are expected to have a higher peak to average ratio.

11. Amendment to 4th paragraph, page 9 of the Specification:

Rule ~~III~~^{IV} is directed to cases wherein there is (a) a higher product of traffic channel gains for a pair of binary Walsh code vectors, and (b) the sum of the binary Walsh code vectors gives a Walsh code with an index that is a multiple of eight. In such cases the pair of binary Walsh code vectors makes a higher contribution to the peak to average ratio other pairs. For example, the pilot channel is assigned Walsh code zero and a high channel gain. A traffic channel can then be assigned a Walsh code with an index that is a multiple of eight. The contribution of this pair of codes to the peak to average ratio is more significant. For example, the contribution of this pair is more significant than the contribution of a pair of Walsh codes with a binary sum that is a Walsh code with an index that is a multiple of eight.

12. Amendment to 1st paragraph, page 10 of the Specification:

Fig. 34 show graphical representation 400 for comparing the peak to average ratio in the case of equal channel gain along with highly unequal channel gain. Graphical representation 400 is a 1-CDF plot with different transmit channel gains. The Walsh code set used in the simulation of graphical representation 400 is WCC-2. As previously described with respect to graphical representation 300, N=8, RS2, and fixed full rate. Thus, graphical representation 400 illustrates that if the traffic channel gains are approximately equal the peak to average tends to be higher than if they are unequal.

13. Amendment to 2nd paragraph, page 10 of the Specification:

Figs. 45A-E show a block diagram representation of biased bin balancing algorithm 500. When Walsh codes are assigned to new calls within a communications system according biased bin balancing algorithm 500, the occurrence of large peaks in the transmit power level of the combined signals is reduced to one tenth of a percent. This should be compared with an occurrence of approximately one percent using a random Walsh code assignment method.

14. Amendment to 2nd paragraph, page 12 of the Specification:

Fig. 56 shows Walsh code assignment state diagram 600. Walsh code assignment state diagram 600 represents a process performed in accordance with the present invention and includes a total of four states. Transition from idle state 610 of assignment state diagram 600 is controlled by two binary variables, *new_user_arrives* and *old_user_departs*. The two binary variables are set to a value of TRUE when a new user, either an originating or a handoff, requests a Walsh

code channel or an old user is unassigned a Walsh code channel, respectively.

15. Amendment to 4th paragraph, page 16 of the Specification:

Fig. ~~67~~ shows graphical representation 900 that compares the peak to average ratio for different Walsh code assignments with the same bin configuration as shown in Table II. Graphical representation 900 is a 1-CDF plot, $N=8$, RS2, fixed full rate. The Walsh code assignments for the active traffic channels are:

16. Amendment to 2nd paragraph, page 17 of the Specification:

Fig. ~~78~~ shows graphical representation 1000 illustrating the peak to average ratio of the Walsh code sets of Table III. In accordance with the waveforms of graphical representation 1000 the peak to average ratios of the Walsh code sets increase as the bin imbalance increases.

17. Amendment to 3rd paragraph, page 17 of the Specification:

Further to Rule ~~IIIIV~~ above, the peak to average ratio also depends on the traffic channel gains. Thus, in an alternate embodiment of biased bin balancing algorithm 500 the *bin_value* of each bin can contain the traffic channel gains corresponding to the Walsh codes belonging to the bin. Two methods of updating the bin values using the traffic channel gains can be used in accordance with this alternate embodiment in order to improve performance.

18. Amendment to 3rd paragraph, page 19 of the Specification:

Fig. ~~89~~ shows graphical representation 1100, illustrating a probability plot for bin imbalance. The imbalance in a bin configuration if most of the assigned Walsh codes belong to a small number of bins. This corresponds to a large value of M and, possibly, a large value of j .

Graphical representation 1100 shows the probability $P(N, M, J)$ for values M and J where $N=17$. In another alternate embodiment, bins v_3 and v_4 can be selected randomly if they both have the same number of active Walsh codes.